Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Promoting Investment in the 3550-3700 MHz Band	)	GN Docket No. 17-258
	)	

COMMENTS OF NCTA – THE INTERNET & TELEVISION ASSOCIATION

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I. INTRODUCTION AND SUMMARY

The Commission has a unique opportunity in this proceeding to make narrow, targeted changes to its rules to provide a more predictable and attractive investment climate for prospective licensees who intend to deploy across a broad geographic footprint, while maintaining the low barriers to entry that have already attracted substantial interest and investment from new entrants. As Commissioner O'Rielly recently noted, the Commission should calibrate such changes to its licensing and technical rules carefully "to ensure that investment and innovation [are] promoted, that flexible use is permitted, and that the spectrum is attractive to as many users as possible," while avoiding "artificial restrictions through license and auction structure [that] dissuade some uses or users while promoting others."[1]

Because the Commission initially adopted rules for this band in 2015, stakeholders have had years to plan and the market has already begun to evolve. Prospective network operators, equipment vendors, and SAS and ESC operators have been working together in the standards process and in trials to put flesh on the bones of the Commission's rules, and the Commission knows more now about the services contemplated for this band than it did in 2015. For example, some operators intend to deploy 5G small cells for capacity increases in urban areas. Some plan to deploy fixed wireless links to bring broadband connectivity to the rural unserved. Others hope to use 3.5 GHz spectrum for IoT or machine-to-machine deployments in factories and

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[1] Michael O'Rielly, Commissioner, FCC, *Statement re Promoting Investment in the 3550-3700 MHz Band*, GN Docket No. 17-258; *Petitions for Rulemaking Regarding the Citizens Broadband Radio Service*, RM-11788 (Terminated), RM-11789 (Terminated) (Oct. 24, 2017) (Commissioner O'Rielly Statement).

businesses, and still more plan neutral host deployments or private LTE networks in managed buildings or on campuses.

Given this outpouring of interest by diverse companies in a great variety of potential business models and technologies, the Commission should act with confidence that its existing rules have already achieved many of its goals for this band. NCTA nevertheless agrees that a few limited changes will further incent investment in Priority Access Licenses (PALs) while still attracting investment by new entrants and enabling a variety of business models, ultimately benefitting American consumers.

The challenge, of course, remains in balancing the details—what license size and term will enable access to 3.5 GHz spectrum for nationwide carriers and new entrants alike without strongly favoring one business model over another? The PEAs and ten-year renewable terms proposed by the carriers would substantially increase the barriers to entry in this band and diminish interest among many of the new entrants who have already invested time and capital toward operating 3.5 GHz networks. Instead, the Commission should adopt county-sized licenses and seven-year, renewable terms, which strike the right balance by improving regulatory certainty and ease of administration and also maintaining low barriers to entry. The Commission can enable further flexibility by establishing partitioning and disaggregation rules, and can hold licensees accountable for efficient spectrum use by adopting appropriate performance requirements.

The Notice of Proposed Rulemaking (NPRM) also tees up a variety of other proposed adjustments to the existing 3.5 GHz rules, many of which NCTA supports. In particular, the Commission should:

- Make all of the PALs in a license area available for assignment—regardless of how many applicants seek PALs in that area—because an operator's need for interference-protected

spectrum is driven by customer demand, not the actions of third parties outside the operator's control;

- Revise its rules to require SASs to keep most CBSD registration information confidential in order to avoid exposing sensitive data that could threaten competition and network security;

- Retain its rules specifying that SASs must assign PAL frequencies dynamically rather than allow bidding on specific spectrum blocks because dynamic assignment will best promote continuity of service when a CBSD detects incumbent radar operations;

- Ensure any changes to the emission mask do not cause harmful interference to adjacent C-band operations; and

- Encourage stakeholders to explore how SASs can enable equitable coexistence among GAA users as part of the standards process.

Adopting these modest changes to the 3.5 GHz rules will provide a more secure investment climate for PAL operators while maintaining low barriers to entry for diverse and innovative business models. NCTA urges the Commission to adopt these changes expeditiously to provide certainty to 3.5 GHz stakeholders and lay a strong foundation for the auction and deployment that will put this spectrum into the hands of American consumers.

II. NCTA CONTINUES TO SUPPORT A REASONABLE EXPANSION OF PAL GEOGRAPHIC AREAS

A. Counties strike the right balance between incenting investment and enabling market access by new entrants

The NPRM seeks comment on increasing the geographic area size for PAL licenses to Partial Economic Areas (PEAs), counties, or a combination of different PAL license areas.[2] As reflected in its comments on the carriers' petitions for rulemaking, NCTA supports a modest

[2] *Promoting Investment in the 3550-3700 MHz Band; Petitions for Rulemaking Regarding the Citizens Broadband Radio Service*, Notice of Proposed Rulemaking and Order Terminating Petitions, 32 FCC Rcd 8071, 8080-81 ¶¶ 23-25 (NPRM).

increase in PAL size to reduce the administrative burden on the Commission and on network operators and to incent investment by operators seeking to deploy in a larger footprint.[3] However, NCTA continues to believe that the Commission should design its licensing rules in this innovation band to enable investment by a wide variety of market participants, including by reducing the capital requirements associated with purchasing traditional mobile spectrum licenses in other bands. To accomplish these goals, the Commission must adopt right-sized licenses—large enough to attract investment by typical mobile market participants, but small enough not to price out or otherwise exclude new entrants who plan to offer innovative services to consumers.

Counties strike just the right balance. By reducing the total license areas from 74,000 census tracts to approximately 3,150 counties, the Commission would reduce auction complexity and significantly simplify license management burdens and border coordination issues. County-sized licenses are also well-suited to the footprints of the large mobile carriers. As the Commission noted in the Spectrum Frontiers NPRM, counties serve as the building blocks for traditional license areas such as Economic Areas and Cellular Market Areas and carriers may aggregate them to achieve coverage that aligns with their existing footprints.[4]

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[3] NCTA – The Internet & Television Association Comments on Petitions for Rulemaking, GN Docket No. 12-354, RM-11788, RM-11789, at 8-10 (filed July 24, 2017) (NCTA Comments). Unless otherwise noted, citations to comments herein refer to comments on petitions for rulemaking filed in GN Docket No. 12-354, RM-11788, and RM-11789 on July 24, 2017.

[4] *See Use of Spectrum Bands Above 24 GHz for Mobile Radio Services, et al.*, Notice of Proposed Rulemaking, 30 FCC Rcd 11,878, 11,912 ¶ 111 (2015).

County-sized licenses would also support rural deployment better than PEAs. WISPs and others have argued that smaller license sizes are more likely to encourage investment in rural areas by smaller companies that wish to serve a targeted geographic population and that, under a large-license approach, would be required to bid for much more spectrum than they actually need or could use.[5] Google states that "with larger license areas, rural areas are more likely to be combined with urban markets in a single PEA. Rural providers would therefore have to bid for license areas that include residents and territory far outside their service areas, and bid against large carriers that seek primarily to serve densely populated areas."[6]

Counties can significantly reduce this problem. For instance, under PEA licensing rules, a small provider that wished to serve rural Monroe County or Carbon County, Pennsylvania would be required to win at auction a license in PEA 1, which also includes the five boroughs of New York City, Newark, New Jersey, and Hartford, Connecticut.[7] Similarly, a small provider that wished to serve rural Calvert, Caroline, Carroll, Charles, Dorchester, Harford, Kent, Queen Anne's, St. Mary's, or Talbot counties in Maryland would be required to win an auction for a

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5 Comments of the Wireless Internet Service Providers Association at 22-23 (WISPA Comments); Reply Comments of Google Inc. and Alphabet Access in Response to Petitions for Rulemaking, GN Docket No. 12-354, RM-11788, RM-11789, at 11 (filed Aug. 8, 2017) (Google Replies). Unless otherwise noted, citations herein to reply comments refer to replies to comments on petitions for rulemaking filed in GN Docket No. 12-354, RM-11788, and RM-11789 on August 8, 2017.

6 Google Replies at 11 (footnote omitted).

7 *See Wireless Telecommunications Bureau Provides Details About Partial Economic Areas*, Public Notice, 29 FCC Rcd 6491, 6502, app. B (2014) (PEA PN) (displaying the counties that make up PEAs); The Center for Rural Pennsylvania, *Rural Pennsylvania Counties*, http://www.rural.palegislature.us/demographics_rural_urban_counties.html (indicating that Monroe and Carbon counties are considered rural under 2010 census results).

license in PEA 5, which also includes the District of Columbia and Baltimore.[8] In contrast, a county-based geographic licensing approach would enable a rural provider to compete in an auction for just one of the rural counties listed above, significantly reducing the cost of the license and increasing the probability of securing one. Although certain counties also span both urban and rural areas, opting for counties rather than PEAs significantly reduces the problem and is therefore more likely than a PEA approach to foster CBRS deployment by smaller providers in rural areas.

B. The Commission should not adopt PEA-sized licenses

In contrast to counties, PEAs would be a poor fit for the 3.5 GHz band. First, PEAs would be a poor fit for spectrum that the mobile carriers intend to use to deploy small cells primarily for targeted capacity increases in urban areas.[9] Many carriers have highlighted the importance of the 3.5 GHz band for 5G, and have described their plans to deploy small cells for capacity in discrete areas.[10] In its comments on the CTIA and T-Mobile petitions, for instance, Verizon describes its plans to deploy 3.5 GHz small cells in localized areas much smaller than

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8 PEA PN at 6503-04 app. B; The Rural Maryland Council, *The Rural Maryland Council, How Do We Define Rural in Maryland?*, http://rural.maryland.gov/the-rural-maryland-council (listing the Maryland counties that are considered rural).

9 *See* Comments of Starry, Inc. at 5 (Starry Comments).

10 Letter from Paul Anuszkiewicz, Vice President, Spectrum Planning, CTIA, et al., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 15-319, at Attachment, p. 1 (filed May 16, 2016) ("The 3.5 GHz spectrum is well-suited for small cell deployment, which is already a $1 billion industry that can help address ongoing capacity needs in high-traffic areas."); *see also* T-Mobile Petition for Rulemaking to Maximize Deployment of 5G Technologies in the Citizens Broadband Radio Service, GN Docket No. 12-354, RM-11789, at 5 (filed June 19, 2017) (T-Mobile Petition); Comments of Verizon, GN Docket No. 12-354, at 7 n.21 (filed July 24, 2017) (Verizon Comments).

PEAs, stating that it "intends to use low-power small cells for indoor applications such as enterprises, hotels, airports, convention centers and stadiums, while higher power small cells are suitable for outdoor applications such as large campuses, metro areas, downtown areas and suburban areas."[11] A county-sized license would be a better fit for the types of 3.5 GHz deployments that carriers contemplate, while still enabling carriers to aggregate licenses to achieve a geographic footprint that aligns with their existing deployments.

Second, PEA-sized licenses will stifle competition for interference-protected 3.5 GHz spectrum. A larger license size means a more expensive license, introducing significant barriers to entry that will disproportionately disadvantage new entrants and innovative business models, ultimately resulting in less choice for consumers. As Commissioner O'Rielly noted in his statement on the NPRM, the Commission's role in adopting spectrum policies should be "to ensure that investment and innovation is promoted, that flexible use is permitted, and that the spectrum is attractive to as many users as possible" and not to "adopt artificial restrictions through license and auction structure to dissuade some uses or users while promoting others."[12] The record established in response to the contemplated rule changes makes clear that if the Commission adopts the right rules to enable innovation, many, many users will deploy, including:

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[11] Verizon Comments at 7 n.21.

[12] Commissioner O'Rielly Statement.

- NCTA's member companies, who are exploring use of the 3.5 GHz band for both mobility and fixed wireless use cases;[13]

- Utilities and other critical infrastructure providers that contemplate IoT and machine-to-machine deployments;[14]

- WISPs that contemplate deploying fixed wireless networks, particularly in rural areas, to bring broadband connectivity to the unserved;[15]

- Startups and entrepreneurs who wish to deploy private LTE networks for industrial IoT or other enterprise use;[16]

- Venues and businesses in high-traffic areas, including for neutral-host deployments;[17] and

- As discussed above, large mobile carriers for targeted capacity increases.

PEA-sized license areas are much larger than most of these users need for the business models contemplated, reducing both their incentive and ability to compete at auction for PALs, even where interference-protected spectrum would be critical or beneficial for serving certain customers. The Commission should not depress competition for PAL spectrum and reduce

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[13] *See e.g.*, Letter from Colleen King, Vice President, Regulatory Affairs, Charter Communications, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket No. 17-258, GN Docket No. 12-354, at 2 (filed Oct. 18, 2017) (Charter ex parte).

[14] *See* Reply Comments of the General Electric Company at 2-3; Reply Comments of the Utilities Technology Council at 2-3.

[15] WISPA Comments at iv.

[16] Letter from Engine Advocacy and Union Square Ventures to Marlene H. Dortch, Secretary, FCC, GN Docket No. 12-354 (filed Aug. 8, 2017).

[17] Letter from Center for Rural Strategies; American Library Association; National Hispanic Media Coalition; R Street Institute; Next Century Cities; Schools, Health & Libraries Broadband (SHLB) Coalition; Open Technology Institute at New America; Public Knowledge; Engine; Common Cause; Institute for Local Self Reliance; Benton Foundation; Gigabit Libraries Network; and X-Lab to Chairman Ajit Pai, Commissioner Mignon Clyburn, and Commissioner Michael O'Rielly, GN Docket No. 12-354, at 2-3 (filed June 19, 2017).

consumer choice by adopting a geographic area size that puts licenses out of reach for all but a handful of providers adhering to one business model.

C. The Commission should carefully evaluate other middle-ground approaches

The Commission also seeks comment on the possibility of adopting a hybrid combination of different license sizes, including a combination of PEAs in urban areas and census tracts in rural areas.[18] NCTA remains open to creative licensing approaches that would help to bridge the divide between proponents of PEAs and proponents of census-tracts licenses. However, the Commission should carefully evaluate prospective solutions to ensure that they would meet the Commission's substantive goals without causing significant delays. In particular, the Commission should avoid approaches that would both unnecessarily increase auction complexity and administrative burden while still impeding investment by new entrants in the most sought-after markets. The Commission should also evaluate whether designing a novel licensing scheme and implementing an accompanying auction could cause significant delay. Commenters in this proceeding universally agree that the Commission's consideration of limited additional rule changes should not delay the process of getting 3.5 GHz spectrum into the hands of those who will use it.[19]

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[18] NPRM ¶ 25.

[19] *See, e.g.*, Comments of AT&T Services Inc. at 11 (AT&T Comments); Charter ex parte at 3; Comments of the Dynamic Spectrum Alliance at 20 (DSA Comments); Comments of Google Inc. and Alphabet Access in Response to Petitions for Rulemaking at 30 (Google Comments); Comments of Nokia at 2 (Nokia Comments); Comments of the Open Technology Institute at New America and Public Knowledge at 33; Comments of Ruckus, a Business Unit of Brocade Communications Systems, Inc. at 9; Letter from James Morgan, Director and Counsel, Sony Electronics Inc., to Marlene Dortch, Secretary, FCC, GN Docket No. 12-354, RM-11788, RM-11789, at 1 (filed July 21, 2017); Starry Comments at 2;

D. The Commission should enable partitioning and disaggregation for larger-sized licenses

Although not an adequate substitute for right-sized licenses in this band, enabling partitioning and disaggregation "could be a useful tool to ensure robust and targeted use of the spectrum throughout the license area."[20] The Commission correctly concluded that partitioning and disaggregation do not make sense under the current rules, which establish small, census-tract sized licenses, provide for re-auction every three years, and do not impose build-out requirements.[21] In those circumstances, it is unlikely that a network operator would want or need to partition or disaggregate its license area. If, however, the Commission increases the license size (even to county-sized licenses, as NCTA proposes above), it should enable partitioning and disaggregation. Robust secondary markets rules, including for partitioning and disaggregation, would provide more flexibility both to the license holder (who may itself wish to deploy in a targeted area smaller than a county or PEA) and potentially to others who have a need for inference-protected spectrum in a discrete area but did not or could not win a license at auction.[22] Enabling partitioning and disaggregation for 3.5 GHz licenses, if the Commission adopts larger

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Comments of the Telecommunications Industry Association at 2; Verizon Comments at 1; WISPA Comments at 3.

[20] NPRM ¶ 30

[21] *Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Order on Reconsideration and Second Report and Order, 31 FCC Rcd 5011, 5077 ¶¶ 228-29 (2016).

[22] *See, e.g.*, AT&T Comments at 6; Comments of Ericsson at 7 (Ericsson Comments); Comments of Motorola Solutions, Inc. in Response to Petitions for Rulemaking, GN Docket No. 12-354, at 5 (filed July 24, 2017); Comments of United States Cellular Corporation, GN Docket No. 12-354, at 4-5 (filed July 24, 2017).

license areas, would also be consistent with the Commission's approach to secondary markets for county-sized (and larger) license areas in other bands.[23]

As Federated Wireless has noted, SAS administrators could easily implement secondary markets rules, including to "facilitate and expedite secondary markets transactions, automate them, protect the operations of all players, and handle all reporting to the FCC," reducing at least some of the friction typically associated with secondary market transactions.[24] This unique capability afforded by a SAS could greatly reduce the cost and burden of traditional spectrum manager or de facto transfer leasing, while still providing the requisite regulatory oversight necessary to protect other users of the band.

III. THE COMMISSION SHOULD ADOPT A LONGER, RENEWABLE PAL TERM BALANCED BY APPROPRIATE PERFORMANCE OBLIGATIONS

The Commission should adopt a modest extension of the PAL term, enable network providers to maintain interference-protected access to the spectrum on which their deployments rely, and provide appropriate incentives to build out. In particular, NCTA supports adopting a PAL term that aligns closely with anticipated time necessary to obtain returns on a network operator's investment. NCTA believes that seven-year terms would enable network operators to

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[23] NPRM ¶ 31 ("Allowing partitioning and disaggregation . . . is consistent with the licensing paradigm for other similarly licensed services."); *see also Use of Spectrum Bands Above 24 GHz for Mobile Radio Services, et al.*, Report and Order and Further Notice of Proposed Rulemaking, 31 FCC Rcd 8014, 8094 ¶ 233 (2016) (adopting rules to authorize partitioning and disaggregation of licenses in the 28 and 39 GHz bands (among others), which are licensed by county and PEA, respectively); *Expanding the Economic and Innovation Opportunities of Spectrum Through Incentive Auctions*, Report and Order, 29 FCC Rcd 6567, 6890-91 ¶ 801 (2014) (adopting rules to authorize partitioning and disaggregation of licenses in the 600 MHz band, which is licensed by PEA).

[24] Letter from Ross Vincenti, Chief Legal Office, Federated Wireless, Inc., to Marlene H. Dortch, Secretary, FCC, GN Docket Nos. 17-258 & 15-319, at 2 (filed Dec. 5, 2017).

obtain sufficient return on investment for the types of small-cell deployments envisioned for this band, particularly if the Commission adopts county-sized licenses.

Although the current rules envision the possibility that network operators could obtain two consecutive three-year terms during the first auction window, adopting seven-year terms both for that initial window and beyond would simplify the administrative burden associated with retaining access to interference-protected spectrum resources. If the Commission maintains its rules that require regular auctions at the end of each license term, it would reduce uncertainty and cost for network operators if those auctions took place less than half as often (every seven years, rather than every three, for example). If the Commission instead adopts an expectation of renewal, similarly, extending the renewal term from three to seven years would reduce the total amount of paperwork required for renewals over time. A seven year term also strikes a good balance between the positions of the advocates in this proceeding, falling squarely between the existing three-year terms and the ten-year terms proposed by the carriers.

In addition to a longer license term, the Commission should adopt an expectation of renewal accompanied by appropriate performance requirements. Once a network operator has invested in deployments and demonstrated that it is providing service, the operator should have a mechanism at the end of the license term for retaining access to the spectrum on which it based its investment. This model has successfully promoted investment and build out in other licensed bands and it makes sense to adopt it here. The Commission therefore correctly explores renewability and other possible options for providing potential investors additional certainty that

a critical input to their service will more likely than not remain available to them beyond their initial seven-year term.[25]

Longer, renewable terms, however, also require appropriate performance obligations. The Commission typically adopts performance requirements in licensed bands where it provides for longer license terms and an expectation of renewal in order to prevent warehousing and promote investment in new technologies and services. The Commission concluded that such requirements were unnecessary under the current rules, which provide for short license terms and do not permit renewals.[26] If, however, the Commission extends the term and adopts a renewal expectation without adopting performance requirements, carriers would have few incentives to build out to the full extent of their license area or population beyond where deployment serves their economic interest. Adopting performance requirements, which should be fulfilled prior to renewal, would ensure that a carrier who has purchased a license for interference protected spectrum has appropriate incentives to use that spectrum efficiently.

In larger licenses areas, the possibility of opportunistic GAA use is not sufficient to prevent warehousing and ensure that PAL spectrum is used efficiently. Even if opportunistic GAA operations make use of fallow PAL spectrum, a PAL licensee who fails to make use of a substantial portion of its licensed spectrum nevertheless excludes other potential users who wish to deploy in the area and would benefit from interference protection. In a census-tract sized license, even if a carrier fails to build out to the full extent of the license area, only a relatively small geographic are remains unserved by the licensee and off limits to other prospective PAL

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[25] *See* NPRM ¶¶ 16-19.

[26] *See Amendment of the Commission's Rules with Regard to Commercial Operations in the 3550-3650 MHz Band*, Report and Order and Second Further Notice of Proposed Rulemaking, 30 FCC Rcd 3959, 3997 ¶ 113 (2015) (2015 Order).

operators. With larger license sizes, the Commission risks that a much larger geographic area could potentially remain unserved by the licensee but off limits to others with a need for interference-protected spectrum. Appropriately tailored performance requirements would ensure that a PAL holder cannot indefinitely exclude others from limited PAL resources while failing to make efficient use of its licensed spectrum.

IV. NCTA SUPPORTS MANY OF THE OTHER CHANGES PROPOSED BY THE COMMISSION

A. The Commission should make all of the PALs in a given license area available for assignment, regardless of the number of PAL applicants in that area

In its 2015 Order, the Commission adopted an unnecessary restriction on the number of PALs to be made available for assignment, concluding that "when there are two or more applicants for PALs in a given census tract for a specific auction" it would "make available one less PAL than the total number of PALs in that tract for which all applicants have applied."[27] As many commenters have persuasively articulated, this mechanism means that protected spectrum availability will be driven by who else applies rather than by the quality of service needs of a network operator and its customers.[28] Commenters also make the case that, if the Commission retains the existing rules requiring it to conduct periodic auctions of 3.5 GHz spectrum rather

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[27] *Id.* ¶ 133.

[28] *See, e.g.*, AT&T Comments at 10 ("Licensees' ability to retain their licenses should never be contingent on the actions of third parties whose behavior is entirely outside licensees' control."); Ericsson Comments at 7; Nokia Comments at 8; Reply Comments of United States Cellular Corporation, GN Docket No. 12-354, at 14 (filed Aug. 8, 2017) ("A lack of competing applicants in no way diminishes a given entity's need for exclusive-use spectrum, so it should have no bearing on the ability of an otherwise qualified applicant to acquire the PAL(s) it requires to provide service to the public.").

than adopt an expectation of renewal, the "N-1" rule risks phasing out the number of PALs available to a licensee over time.[29] Although the latter point would be mooted by a Commission decision to adopt a renewal expectancy, as NCTA supports above, NCTA nevertheless urges the Commission not to distort market realities by retaining the N-1 restriction. As Nokia notes, creating "artificial scarcity for PALs" by pegging available PALs to the number of PAL applicants would "deny the benefits of a PAL to a qualified applicant – whether a carrier, industrial complex, hospital, etc. – simply because there was not enough demand by others to compete for PAL rights," which "would not serve the public interest."[30]

B. SASs should dynamically assign PAL frequencies

NCTA urges the Commission not to adopt T-Mobile's proposal to allow bidding on specific spectrum blocks.[31] The current rules enable better continuity of service for consumers while instructing SASs, where feasible, to provide additional certainty to PAL operators who wish to aggregate multiple PALs spectrally or across geographic areas.

Dynamic assignment, rather than assignment of specific blocks of spectrum, will provide better continuity for interference-protected PAL service when incumbent radars are operating.[32] If an operator has static access to a specific 10-MHz PAL channel it won at auction and incumbent radar begins to operate there, the operator and its customers must cease using its PAL spectrum. In a dynamically assigned environment, that same operator would have access to a fungible 10 MHz PAL, enabling a SAS to instruct it merely to switch channels if the ESC/SAS

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29 AT&T Comments at 9-10; Ericsson Comments at 7-8; *see also* T-Mobile Petition at 13-14.

30 Nokia Comments at 8.

31 *See* NPRM ¶ 49; T-Mobile Petition at 15-16.

32 *See* Google Comments at 27-28.

detect incumbent operations, rather than shut off altogether. For example, if incumbent radar begins operations in Channel 1 where a PAL licensee is operating, a SAS may reassign the operator to Channel 2, 3, 4, etc., if available. Although static bidding on particular blocks can provide operators additional certainty regarding the operating environment in other spectrum bands, block-specific bidding at 3.5 GHz would have the opposite effect.

The Commission's existing rules strike the right balance by enabling dynamic assignment, while providing that, where feasible, a PAL operator with multiple PALs adjacent either in frequency or in geographic area, will be granted contiguous slots. Specifically, the rules require that a SAS must "assign geographically contiguous PALs held by the same Priority Access Licensee to the same channels in each geographic area" and "assign multiple channels held by the same Priority Access Licensee to contiguous channels in the same License Area," where feasible.[33] Industry groups like WINNForum and CBRS Alliance already have invested considerable time and effort to ensure that SAS implementations realize these requirements.

C. The Commission should keep most CBSD registration information confidential

As many parties supported in response to petitions for rulemaking,[34] the Commission proposes in the NPRM "to prohibit SASs from disclosing publicly CBSD registration

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[33] 47 C.F.R. §§ 96.25(b)(1)(i), 96.25(b)(2)(i), 96.59(b).

[34] *See* CTIA Petition for Rulemaking to Amend the Commission's Rules Regarding the Citizens Broadband Radio Service in the 3550-3700 MHz Band, GN Docket No. 12-354, RM-11788, at 11 (filed June 16, 2017); T-Mobile Petition at 19-20; AT&T Comments at 11-12; Ericsson Comments at 3, 8-9; Letter from John Giusti, Chief Regulatory Officer, GSM Association, to Marlene H. Dortch, Secretary, FCC, GN Docket Nos. 17-183 & 12-354, RM-11788, RM-11789, at 3-4 (filed Aug. 8, 2017); Nokia Comments at 8-9; Verizon Comments at 9.

information that may compromise the security of critical network deployments or be considered competitively sensitive."[35] NCTA agrees that CBSD registration information should, in general, be protected from public disclosure. However, sufficient information should be made available to allow prospective network operators to plan and execute their deployments.

CBSD registration information includes a device's: "geographic location, antenna height above ground level (in meters), CBSD class (Category A/Category B), requested authorization status (Priority Access or General Authorized Access), FCC identification number, call sign, user contact information, air interface technology, unique manufacturer's serial number, sensing capabilities (if supported)," as well as signal strength in its occupied and adjacent frequencies, interference metrics, and the channels or frequencies it will use.[36] Category B CBSDs must, in addition, transmit to a SAS their "antenna gain, beamwidth, azimuth, downtilt angle, and antenna height above ground level."[37] Even if a SAS "obfuscates the identities of the licensees" in making this registration information available to the public,[38] an observer could with very little effort correlate the CBSD locations with a network operator's known footprint. Such an observer would then possess very detailed, competitively sensitive network information that could also be used to inform cyber or physical attacks on particular network infrastructure. To avoid putting CBSD networks at risk and to promote competition, the Commission should protect CBSD registration information.

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35 NPRM ¶ 37.

36 47 C.F.R. § 96.39(c)-(e).

37 *Id.* § 96.45(d).

38 *Id.* § 96.55(a)(3).

At the same time, the Commission's rules should permit a SAS to make available sufficient information to enable prospective network operators to plan deployments. The Commission should adopt rule modifications that will both protect sensitive CBSD registration details and authorize SASs to make available sufficient, aggregate information to prospective network operators, upon request, to enable them to understand the spectrum environment in areas where they wish to deploy.

V. ANY CHANGES TO CBSD EMISSION LIMITS MUST NOT ADVERSELY AFFECT ADJACENT C-BAND OPERATIONS

The Commission seeks comment on changes to the 3.5 GHz emission limits that Qualcomm and the Commission itself have suggested will allow network operators to bond channels without reducing transmit power.[39] Although NCTA expressed support for emissions limit changes that would accommodate the use of wider bandwidth channels in response to petitions for rulemaking, it did so on the understanding that such changes would not adversely impact adjacent C-band users.[40]

While the proposed emissions mask changes would preserve the -40 dBm/MHz out of band emission limit adopted to protect the operations of incumbents in adjacent bands,[41] NCTA now understands that both Qualcomm's proposed emission limits and the variation proposed by the Commission[42] could nevertheless significantly increase the noise from CBRS operations spilling over into the first 20 MHz of adjacent C-band spectrum. Because the Commission did

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39 NPRM ¶¶ 54-56.

40 *See* NCTA Comments at 14-17.

41 *See* 47 C.F.R. § 96.41(e)(2).

42 *See* NPRM ¶¶ 54-56.

not adopt guard bands or exclusion zones to protect adjacent licensees, the Part 96 rules that set forth emission limits constitute the only protection for adjacent C-band operators.[43] A significant increase in the noise between 3700 and 3720 MHz as a result of the proposed emissions changes could adversely impact the quality of television programming and other services delivered using the transponder immediately adjacent to CBRS operations. If the Commission moves forward with changes to the CBSD emissions mask, it must tailor the rules appropriately (at a minimum at the upper band edge) to ensure that CBSDs do not cause harmful interference to adjacent C-band operations.

VI. THE COMMISSION SHOULD ENCOURAGE STAKEHOLDERS TO ADDRESS IN THE STANDARDS PROCESS HOW A SAS MIGHT ENSURE EQUITABLE COEXISTENCE AMONG GAA USERS

Commenters have discussed the benefits of a robust GAA tier for consumers, including facilitating economies of scale for equipment, thereby reducing costs, and enabling CBRS innovation without the up-front cost of a license.[44] The Commission and all CBRS stakeholders should therefore work to ensure that the rules and standards for GAA operators will attract interest from a variety of market participants and incent investment.

To stimulate robust interest in GAA, all prospective GAA users must feel that they have an equal footing—that if they invest in GAA, the opportunity they would be afforded to access spectrum opportunistically would be the same as that afforded to another GAA user. Unlicensed

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[43] *See Wireless Telecommunications Bureau, Office of Engineering and Technology, and International Bureau Announce Procedures for Registration of Fixed Satellite Service Earth Stations Entitled to Protection from the 3.5 GHz Citizens Broadband Radio Service*, Public Notice, GN Docket No. 17-258, DA 17-1232, at 2-3 (rel. Dec. 21, 2017).

[44] *See, e.g.*, Comments of Open Technology Institute at the New America Foundation, Institute for Local Self-Reliance, Public Knowledge, and Common Cause, GN Docket No. 12-354, at 16 (filed Aug. 15, 2014).

technologies have successfully managed contention protocols as part of the standards process, for instance ensuring that Wi-Fi devices listen before they talk and back off if they hear another Wi-Fi transmission. GAA users similarly need an equitable way to ensure coexistence. Because the Commission's rules do not set forth specific coexistence guidelines for GAA, stakeholders should address through the standards process how SASs can establish mechanisms for equitable coexistence among GAA users. The Commission should track this process and encourage stakeholders to adopt a reasonable and equitable GAA coexistence mechanism.

VII. CONCLUSION

The Commission should adopt moderate changes to the PAL rules to encourage investment by prospective licensees while ensuring that PALs remain accessible to new entrants, including those who wish to serve targeted areas. NCTA believes that county-sized licenses with a renewable seven-year term strike the appropriate balance. The Commission should also: (1) adopt appropriate performance requirements; (2) make all of the PALs in a given license area available for assignment, regardless of the number of PAL applicants in that area; (3) preserve its rules enabling SASs to assign frequencies dynamically; (4) keep CBSD registration information confidential; (5) prevent emissions mask changes from introducing harmful interference into adjacent C-band spectrum; and (6) encourage stakeholders to address GAA coexistence in the standards process.

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